

-Before the California Energy Commission

**Committee Workshop on the)
July 2006 California Heat)
Storm – August 29, 2006)
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Prepared Comments of Earl Bouse for the California Large Energy Consumers Association on Interruptible Program Issues

My name is Earl Bouse and I am offering Comments on behalf of Hanson Permanente Cement and the California Large Energy Consumers Association in response to the Committee's call for information concerning, and reactions to the recent heat storm experienced by California. Specifically, I would like to address the existing utility interruptible programs in this context and to discuss how such programs fit into the production process for large, 7 x 24 manufacturing facilities such as cement manufacturers. The interruptible programs were an important element of the response to the extraordinary demands on the electric system caused by the enormous increase in air conditioning-driven electric demand during the heat storm.

I currently act as a consultant to Hanson Permanente Cement, both with respect to the energy needs of its cement manufacturing facility located in Cupertino, California, and with respect to certain environmental issues associated with its sand and aggregates business in California. From 1993 to 2003, I was employed by Hanson with principal responsibility for electricity issues, including both costs and availability. I have also worked as Plant Manager at several cement plants, including a stint at the Lebec, California facility operated by General Portland Cement during the period 1978- 1987, at the time the first interruptible programs were being developed by the utilities. Indeed, I was integrally involved in the development of these

rate options. In short, I have a working knowledge of both cement plant operations and the impact of the utility interruptible programs on such operations.

For at least 20 years, both Southern California Edison Company (“Edison”) and Pacific Gas & Electric Company (“PG&E”) have offered their large industrial customers an interruptible or curtailable rate option. The basic concept of the interruptible programs is that the customer agrees to curtail its demand to a pre-established level, referred to as the Firm Service Level, upon 30 minutes notice from the utility. The trigger for the utility call to the customer for interruption is the ISO’s anticipation of an imminent Stage 2 emergency, that is, when the ISO determines that operating reserves will fall below 5% without the interruption of nonfirm load. These programs have pre-established limits on the number of interruptions, their frequency and their duration. Depending on the specific program, the customer is exposed to the possibility of one interruption per day, four per week, and 25-30 per year depending on the utility. These interruptions can last up to 6 hours each and the total hours of interruption are also capped for the year, 100 hours for PG&E and 150 hours for Edison. Further, the programs have very significant penalties for non-compliance – the customer loses most of the annual value of the incentive for failing to curtail on just one occasion.

While the specifics of the programs, including the incentives, have changed over the past 20 years, the basic structure has remained rather stable. These programs provide customers with a rate discount, sometimes referred to as an incentive or credit, in exchange for their willingness to interrupt their electric load upon notice from the utility. The amount of the rate discount has been based on the annual cost of a combustion turbine peaking unit, the resource that might serve the need filled by the interruptible program were it not available. Currently, the Base Interruptible Program (“BIP”), one of two interruptible options offered, includes an incentive equal to \$7/kW-month, or \$84/kW-yr. The Edison I-6 tariff and the PG&E Non Firm program have slightly lower incentives as expressed in \$/kW-yr but can be more attractive when translated into rates for specific customers. Depending on the customer’s load characteristics,

these incentives can amount to a discount of between 0.7 and 1.1 cents/kWh, and they have been viewed by customers as a valuable tool in their effort to obtain affordable electricity. The level of the discount is an issue of contention in utility rate proceedings, which creates a degree of uncertainty for interruptible customers. At various times, there have been calls for elimination of the programs, adding to customer uncertainty. Further, the Public Utilities Commission has directed both Edison and PG&E to transition their interruptible customers from existing interruptible rate options onto a new option referred as the Base Interruptible Program or (“BIP”).

It is my understanding that, after some problems with the operation of the Edison program in the late 1990’s, customer response to calls for interruption under both the Edison and PG&E programs has been very good. During the energy crisis, the interruptible programs were exercised repeatedly, day after day, and sometimes multiple times within a day. That made it virtually impossible for industrial customers on interruptible schedules to operate their facilities at all during this period. I know that Hanson simply closed its Permanente facility for an extended period in January 2001 as a result of the repeated interruptions. Since then, regulators have recognized that the programs were not intended to reduce energy consumption but rather to reduce electric demand at times of system peak crisis, and they have implemented modifications to restrict the frequency and duration of interruptions. For example, the programs cannot be called more than once a day, nor more than four times in a week.

You have asked about Permanente’s response to the heat storm. On July 24 the kiln and all the mills that could run were running. When PG&E called for the interruption, Permanente immediately shut down all facilities for the duration of the event. On July 25, Permanente’s Production Manager was watching the ISO’s load on line. He called PG&E and volunteered to shut down the mills. PG&E said this would help and Permanente dropped 15 MW. I think this demonstrates our commitment to the non-firm rate program.

It may be helpful to the Committee, in its effort to understand customers' views of the interruptible program, to provide you with a little background on the impact of the non-firm program on a complex manufacturing process such as cement. The Hanson Permanente facility in Cupertino consists of a rock quarry, crushing/grinding operations, rock blending facilities and a pre-heater / pre-calcliner kiln that elevates the temperature of the blended limestone raw meal to around 2700 degrees F in order to turn the meal into clinker, It also includes a finish grinding system that converts the clinker to Portland cement with the addition of gypsum. The final step is to load the product into customer trucks and rail cars. This cement plant produces approximately 1.5 million tons of cement per year and has a normal electricity demand of roughly 30 MW. It operates around the clock, seven days a week and is taken out of service once each year for an annual maintenance operation that typically lasts 3 to 4 weeks. While cement operations differ in size and vintage, this facility is typical of such facilities in California. The Permanente facility uses electricity principally to run enormous electric motors, some as large as 5,000 HP, to turn the crushing and grinding facilities, to turn the kiln and to provide combustion and cooling air for kiln process. It does not use electricity to heat material, and its process does not involve molten materials, as do some steel or glass operations.

The fact that the principle loads are electric motors, and the absence of molten materials, makes cement plants good candidates for participation in interruptible programs. These motors can be shut down relatively quickly without loss of product or harm to the plant. Similarly, they can be restarted fairly promptly at the end of an interruption. The exception is the kiln. This enormous steel tube (visualize a tube 12-16 feet in diameter and roughly 250-550 feet long), operates at an internal temperature of 2700 degrees and must be continuously rotated, both to move material through the kiln and to keep the kiln from warping. It is also lined with refractory bricks to protect the steel shell from the very high internal temperatures. Large electric motors are used to turn the kiln and operate huge fans. If it were to be suddenly stopped, as a result of an interruption, it would warp and would likely be ruined. Thus, Hanson maintains backup

generation to turn the kiln and cool the clinker during a cool-down period if electric service from PG&E is lost. Because of its confidence in this backup generation, Hanson actually includes the kiln motors along with the crushing and grinding motors in the electric load it is willing to interrupt. Thus, Hanson specifies a zero firm service level and, when a call for interruption comes, it shuts down the entire plant.

Hanson made the decision to take interruptible service after a careful review of the economics, both in terms of electric savings and in terms of the costs of lost production, interrupted deliveries to customers and possible damage to equipment. Because the cost of electricity is such a significant element in Hanson's cost of production, the incentive of roughly 1 cent/kWh tips the evaluation in favor of participation. There are costs to Hanson, however, and they can be significant. One type of cost is simply the disruption caused by interrupting plant operations. A single 6-hour interruption will mean that the Permanente facility is out of operation for 24 to 36 hours. Much of this extra down time has to do with the need to cool the kiln, check it thoroughly and then carefully and gradually reheat it to operating temperature. During this process, the energy used to heat the kiln is essentially not productive. So, the hours of potential interruption under the program have an outsized impact on the actual hours that a facility like Permanente is out of operation.

Secondly, cement plants typically do not have much storage for finished product as it tends to be expensive. Hanson has sufficient inventory of finished product to cover the typical interruption. However, in order to serve customers who need the finished product on a steady basis, Hanson has to use small on-site generation units to run the loading facilities. It faces the risk that a number of interruptions over a relatively short period will cause it to run out of product and the risk that these on-site generators will fail, causing deliveries to customers to be interrupted.

Another important cost concern involves the kiln. It is designed to run continuously and, each time it is shut down, there is loss of the protective coating on the refractory bricks and of a

portion of the bricks' thickness. Thus, each interruption and shut-down of the kiln takes some of the life of the refractory, accelerating the time when it must be replaced.

The interruptible program, under the current operating parameters and with the current incentives, makes sense for Hanson, and I think it provides value to PG&E and to the ISO grid. But the program really needs to be a program to address emergency conditions. If it were modified to operate as just one more generation resource, dispatched by the ISO in response to economic signals in the market for example, it would simply not make sense for Hanson. That is to say, there are real constraints on the number of interruptions and the frequency of interruptions that Hanson's Permanente facility can accept and still have the program make any economic sense. Hanson hopes the program continues. We think it provides a valuable resource to address conditions in which the electric grid needs a very quick reduction in load to stay in balance.